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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,743	09/19/2005	Craig N Schubert	62212A	3393
109 7590 01/07/2010 The Dow Chemical Company Intellectual Property Section P.O. Box 1967 Midland, MI 48641-1967				
EXAMINER WU, IVES J				
ART UNIT		PAPER NUMBER		
1797				
MAIL DATE		DELIVERY MODE		
01/07/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

## Application No.

10/549,743

## Applicant(s)

SCHUBERT, CRAIG N

## Examiner

IVES WU

## Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 19, 20 and 23-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19, 20 and 23-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/5508)  
Paper No(s)/Mail Date 6/26/2009/6/8/2009
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

#### DETAILED ACTION

- (1). Applicant's Amendments filed on 9/28/2009 has been received.  
Claims 1-10, 21-22 are non-elected and withdrawn.  
Claims 11-18 are cancelled. New claims 29-30 are added.  
A new ground of rejection for claims 19-20 and 23-30 is introduced in the following.

#### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

- (2). **Claims 19 and 23-25, 30** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In **claims 19 and 30**, it recites: composition contains less than about 9 weight percent of water. This range limitation is not supported in Applicant's Specification. Therefore, it is rejected as being new matter. No where in applicants' examples in the instant specification is an upper limit of 9% supported.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- (3). **Claims 19 and 23-25, 30** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In **claims 19 and 30**, it recites: composition contains less than about 9 weight percent of water. The phrase "about" in claim 19 renders the claim indefinite because the requisite degree is unclear. The phrase "about" is not defined by the claim, also the Specification does not provide a

standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 23-25 are rejected because of their subordination.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

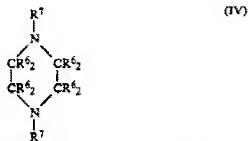
The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

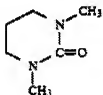
(4). **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bedell (US 5167941A) in view of Landeck et al (US 5413627A).

As to a solvent composition for selective removal of COS from a gas stream containing same comprising a) 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone; and b) one piperazine compound of formula (III) in **independent claim 19**, Bedell (US 5167941A) disclose quaternary polyamines as sulfite oxidation inhibitors in amine scrubbing of SO<sub>2</sub> (Title). The scrubbing solutions contain amines such as piperazinones, morpholinones, piperidines, **piperazines**, piperazinediones, hydantoin, trizinones, **pyrimidinones**, oxazolidones, N-carboxymethylethylenediamines, etc. (Abstract, line 8-12). As shown in the following formula (IV) which reads on piperazine compound as is claimed. Formula (VI) of pyrimidinones reads on the 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone as is claimed. The intended use for selective removal of COS from a gas stream must result in a manipulative difference as compared to the prior art. *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458,459 (CCPA 1963).

Another preferred class of scrubbing amines includes piperazines having carbonyl groups, preferably compounds of the formula:



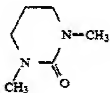
wherein each of  $R^6$  and  $R^7$  is independently hydrogen; an alkyl group; a hydroxyalkyl group; an aldehyde group; a carboxylic acid or salt group; or an alkyl group containing at least one carboxylic ester, carboxylic acid or salt, ether, aldehyde, ketone or sulfoxide; and wherein at least one  $R^6$  or  $R^7$  is a carbonyl-containing group, such as an aldehyde group, a carboxylic acid containing group, a carboxyl ester group, or a ketone-containing group.



As to composition containing less than about 9 wt% of water in **independent claim 19**, Bedell **does not teach** the water content to be less than 9 wt% as claimed.

However, Landeck et al (US 5413627A) **teach** process for the selective removal of inorganic and/or organic sulfur compounds (Title). An object is to make available a scrubbing agent for selective sulfur removal, which, on the one hand, exhibits a relative high selectivity between  $H_2S$  and  $CO_2$  and, on the other hand, offers the possibility of also removing COS and organic sulfur compounds. To achieve these objects, a heterocyclic compound is used as a scrubbing agent having a number n of at least 5 atoms in the heterocyclic ring, of which 2 atoms are heteroatoms, i.e., a ring of at least 3 carbon atoms, with the heteroatoms being either nitrogen

or oxygen, of which at least one heteroatom is nitrogen (Col. 2, line 67- Col. 3, line 4). The following compound is especially suitable within the context of scrubbing agents: 1,3-dimethylpyrimidinane-2-one.



The scrubbing agents and scrubbing agent compositions preferably as little water as possible. Depending on the scrubbing agent, the water portion should be 5% by weight at most, but 0.1 to 3% by weight is preferred (Col. 14, line 45-51).

The advantage of containing water as little as possible is to largely remove water also from gases in the scrubbing so that the previous extensive removal of the water component from the crude gas in a preliminary step is therefore not necessary (Col. 14, line 45-60).

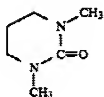
Therefore, it would have been obvious at time of the invention to include water in the scrubbing agent as little as possible disclosed by Landeck et al for the scrubbing agent of Bedell in order to achieve the advantages cited in preceding paragraph.

(5). **Claims 19-20, 23-30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagner et al (US 6852144B1) in view of Bedell (US 5167941A), further in view of Landeck et al (US 5413627A).

As to a solvent composition for selective removal of COS from a gas stream containing same comprising a) 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone; and b) at least one alkanolamine compound of formula (II)  $R_3NHR_4OR_6$  or at least one piperazine compound of formula (III) in **independent claim 19**, a process for selective removal of COS from a gas stream containing COS and  $CO_2$  process comprising contacting the gas stream with a solvent composition comprising a) 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone; and b) at least one alkanolamine compound of formula (II)  $R_3NHR_4OR_6$  or at least one piperazine compound of formula (III) in **independent claim 20**, Wagner et al (US 6852144B1) disclose method for removing COS from a stream of hydrocarbon fluid and wash liquid for use in a method of this

type (Title). COS is selectively removed with respect to CO<sub>2</sub> from a hydrocarbonaceous fluid stream which contains CO<sub>2</sub> and COS. The process is carried out by (1) intimately contacting the fluid stream in an absorption or extraction zone with a scrubbing liquor consisting of an aqueous amine solution containing from 1.5 to 5 mol/l of an aliphatic alkanolamine having of from 2 to 12 carbon atoms and from 0.8 to 1.7 mol/l of at least one activator selected from the group consisting of piperazine, methyl piperazine and morpholine (Abstract, line 1-14). The activator used is advantageously a primary or secondary alkanolamine or a saturated 5- or 6-membered N-heterocycle which optionally contains further heteroatoms selected from oxygen and nitrogen. The activator is advantageously selected from the group consisting of monoethanolamine (MEA), monomethylethanolamine (MMEA), diethanolamine (DEA), piperazine, methylpiperazine and morpholine (Col. 5, line 29-36). Wagner et al **do not teach** pyrimidinone - 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone as claimed.

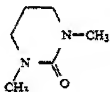
However, Bedell (US 5167941A) **teaches** quaternary polyamines as sulfite oxidation inhibitors in amine scrubbing of SO<sub>2</sub> (Title). The scrubbing solutions contain amines such as piperazinones, morpholinones, piperidines, **piperazines**, piperazinediones, hydantoin, trizinones, **pyrimidinones**, oxazolidones, N-carboxymethylethylenediamines, etc. (Abstract, line 8-12). As is shown in the Figure below, it includes 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone.



In view of functionally equivalent amines in scrubbing liquid such as piperazine, 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone disclosed by Bedell and by Applicant, it would have been obvious at time of the invention to replace piperazine of Wagner et al by the 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone disclosed by Bedell in the scrubbing liquor of Wagner et al based on their interchangeability as functional equivalent amines in the scrubbing liquid. Further evidenced by Landeck et al (US 5413627) that 1,3-dimethyl pyrimidinane-2-one is for inorganic and/or organic sulfur compounds (Col. 7, line 38) which includes COS.

As to wherein the solvent composition contains less than about 9 wt% of water in **claims 19 and 30**, Wagner et al, Bedell **does not teach** the water content to be less than 9 wt% as claimed.

However, Landeck et al (US 5413627A) **teach** process for the selective removal of inorganic and/or organic sulfur compounds (Title). An object is to make available a scrubbing agent for selective sulfur removal, which, on the one hand, exhibits a relative high selectivity between  $H_2S$  and  $CO_2$  and, on the other hand, offers the possibility of also removing COS and organic sulfur compounds. To achieve these objects, a heterocyclic compound is used as a scrubbing agent having a number n of at least 5 atoms in the heterocyclic ring, of which 2 atoms are heteroatoms, i.e., a ring of at least 3 carbon atoms, with the heteroatoms being either nitrogen or oxygen, of which at least one heteroatom is nitrogen (Col. 2, line 67- Col. 3, line 4). The following compound is especially suitable within the context of scrubbing agents: 1,3-dimethylpyrimidinane-2-one.



The scrubbing agents and scrubbing agent compositions preferably as little water as possible. Depending on the scrubbing agent, the water portion should be 5% by weight at most, but 0.1 to 3% by weight is preferred (Col. 14, line 45-51).

The advantage of containing water as little as possible is to largely remove water also from gases in the scrubbing so that the previous extensive removal of the water component from the crude gas in a preliminary step is therefore not necessary (Col. 14, line 45-60).

Therefore, it would have been obvious at time of the invention to include water in the scrubbing agent as little as possible disclosed by Landeck et al for the scrubbing agent of Wagner et al, Bedell in order to achieve the advantages cited in preceding paragraph.

As to component b) being an alkanolamine of formula II in which substituent  $R_3$  is hydrogen in **claims 23 and 26**, component b) being at least one of monoethanolamine, diethanolamine, methylethanolamine, diisopropanolamine, and 2-(2-aminoethoxy) ethanol in



**claims 24 and 27**, component b) to be monethanolamine in **claims 25 and 28**, Wagner et al (US 6852144B1) disclose monoethanolamine (Col. 5, line 34-35).

As to wherein component b) is a compound of formula III in **claim 29**, Wagner et al (US 6852144B1) disclose piperazine (Col. 5, line 35).

#### ***Response to Arguments***

(6). Applicant's arguments with respect to claim 19 regarding the water content less than 9 wt% have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed on 6/9/2009 have been fully considered but they are not persuasive.

Regarding to Applicant's arguments for word "selective", although Applicant compares the experiment data disclosed by Wagner et al , and by Applicant to show that scrubbing composition of prior art Wagner et al (US 6852144B1) works less selective than the composition of Applicant for the COS removal, however, the phrase "selective removal of COS from a gas stream" in instant claim is broad, as to 1). how much is defined for "selective" and 2). With respect to which component in the gas stream the composition is selective over. Wagner et al (US 6852144B1) disclose COS to be selectively removed with respect to CO<sub>2</sub> from a hydrocarbonaceous fluid stream which contains CO<sub>2</sub> and COS (Abstract, line 1-3) that still reads on the limitation of "selective removal of COS from a gas stream".

#### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

Art Unit: 1797

Date: December 14, 2009

/Duane Smith/  
Supervisory Patent Examiner, Art Unit 1797